This amendment responds to the Final Office Action mailed October 18, 2006. In the Office Action the Examiner:

- rejected claims 2, 4-5, 7, 9-11, 13, 15, 17-22, 24 and 27-28 under 35 U.S.C. 103(a) as being unpatentable by Choy et al. (US 5,551,027) in view of Badue et al. (Badue, C., et al., "Distributed query processing using partitioned inverted files," SPIRE 2001, hereinafter "Badue"); and

- rejected claims 12 and 23 under 35 U.S.C. 103(a) as being unpatentable over Badue as applied to claims 1 and 14, and further in view of Agarwal et al. (US 6,816,853).

After entry of this amendment, the pending claims are: claims 2, 4-5, 7, 9-13, 15, 17-24, and 27-28. Twenty claims are pending; claims 27 and 28 are the independent claims.

Amendment to Specification

Applicants thank the Examiner for withdrawing the objection regarding the title of the application, but respectfully bring to the Examiner's attention that Private PAIR has not been updated with the amended title.

Amendment to Claims

Claims 27 and 28 have been amended (A) to clarify that "the plurality of index partitions" comprises all of the partitions of the second document index; and (B) to add elements or operations for performing a search of a first document index and then performing a search of a second document index if the first search results from the first document index do not satisfy predefined criteria (e.g., quantity and/or quality criteria). Support for these changes is found in at least paragraphs 0028, 0029, 0059, 0061 and 0062 of the specification.

Claim Rejections - 35 U.S.C. § 103

Choy does not teach the searching methodology required by the pending independent claims. Further, *Badue* does not fill in the gaps, and therefore Applicants respectfully traverse the Examiner's rejections.

Claim 28

Applicants' methodology uses two levels of indexes: the document index and the partition indexes. The document index is partitioned into pieces called document index partitions. Each document index partition is just a piece of the document index, and not a

separate index level. The partition index keeps track of what terms appear in each document index partition.

Choy teaches a method for searching using two levels of indexes, and suggests that the methodology could be extended to multiple levels. Neither of the Choy methodologies teaches the methodology disclosed by Applicants.

Choy Two-tier Index

In *Choy's* two-tier method, *Choy* teaches the use of a *single* Global Coarse Index and Local Indexes corresponding to horizontal database partitions. With this methodology, *Choy* does not teach several elements of claim 28 :

- **"each document index partition comprising a plurality of document index sub-partitions."** The partitions in *Choy* are partitions of database records rather than partitions of an index, and there are no sub-partitions.

- **"a plurality of partition indexes, each corresponding to a respective document index partition."** The Examiner has indicated that *Choy's* coarse global index corresponds to Applicant's partition indexes. But the coarse global index in *Choy* is global, and does not correspond to a single specific partition. Another way to say this, is that Choy does not teach a plurality of "coarse global indexes" (which would make the term "global" a bit of a misnomer!), does not teach any methodology for dividing its coarse global index into distinct pieces, and furthermore does not teach or suggest that dividing the coarse global index into pieces could be used to extend the scalability of a search index.

- **"a plurality of balancers, each respective balancer configured to receive a search query having a set of terms, comprising one or more terms ... wherein the plurality of balancers operate in parallel."** *Choy* does not teach or disclose a *plurality* of elements that function as balancers. *Choy* implicitly teaches an element that executes a database query, but there is no language to suggest that there would *multiple* such elements operating in *parallel*. (Note that the language at Col 14, lines 15-19 applies only when there is an index scheme with more than two levels.)

Without a plurality of balancers, it is also irrelevant whether *Badue* teaches a mixer to send out the query and collate the results.

Choy Multi-tier Index (Three or More)

Even in the "multi-tier indexing scheme," *Choy* teaches only the partitioning of database records, not the partitioning of an index. For this reason, *Choy* does not teach **"document index partitions."**

In addition, the only multi-tier teaching in *Choy* (starting at col. 14, line 8) is for a "multi-tier **indexing** scheme," (emphasis added), which clearly indicates that it is the index which is multi-tiered. Thus, in a 3-tier indexing scheme according to *Choy*, the index would have three tiers, which is contrary to the requirements of independent claims 27 and 28.

In contrast to *Choy*, independent claim 28 describes a method where the search results from each partition index, of a plurality of partition indexes, are received and collated by a mixer. This method allows for expansion of the document index into a plurality of partition indexes without increasing the number of levels of indexes in the system. That is, Applicant's method uses *two* levels of indexes, searching multiple partitions in parallel without expanding the depth (or number of index levels) of the system. *Choy* does not teach or anticipate a "horizontally" expanded system of partition indexes that uses a two tier index scheme, and which collates search results from multiple document index searches in the manner required by claim 28.

As the Examiner noted, *Choy* does not teach or disclose a mixer that sends search queries to balancers, receives search results from the balancers, and collates the results. Importantly, *Badue* does not fill in this missing element. *Badue* teaches index partitioning using a *single* index level. In contrast, *Choy* teaches partitioning of database records using multiple levels of indexes. Thus, none of the embodiments in Choy have any use for a mixer, nor do any of the embodiments of Choy have any use for the "broker" of *Badue*. Thus, there is no motivation, teaching, or suggestion to combine the single-level index partitioning methodology of *Badue* with the multiple-level data partitioning methodology of *Choy*. Furthermore, even if such motivation existed, adding the "broker" of *Badue* to any of the Choy embodiments does not meet all the requirements of independent claims 27 and 28 (see listing, above, of claim elements not taught by Choy).

Additional Explanation in Response to Advisory Action

In the Advisory Action, the Examiner indicates that if you were to use the 3-tier version of Choy, and ignore the top tier, then the remaining two lower tiers of Choy would correspond to the elements of claims 27 and 28. Applicant responds to this argument as follows. The 2-tier method/system of claims 27 and 28 can be conceived of as a document index that has been configured to be "a mile wide and an inch deep." By sending search queries to all partitions of an index, and then at the second tier sending the query only to those sub-partitions that have a non-zero probability of returning a result, a search query can be processed by every partition of a very large document database (e.g., billions of

documents) in a very small period of time (e.g., much less than a second). The performance benefits of the claimed 2-tier method and system, in terms of speed of returning search results, have been proven in commercial use in the Google search engine. In the 3-tier *Choy* system, the top tier performs processing that selects the partitions to which the search query is to be sent. Thus, the *Choy* system is not configured to send queries to all partitions (2nd level indexes in *Choy*). In addition, the three levels of processing in the 3-tier *Choy* system makes a tradeoff (saving system resources in exchange for increased processing time) that is contrary to the system/method of claims 28 and 27.

In addition, neither *Choy* nor *Badue*, nor any combination thereof, teaches searching a first document index to produce first search results, and then searching a second document index to produce second results if the first search results do not satisfy predefined criteria.

Therefore, claim 28 is patentable over *Choy* in view of *Badue*.

Claims 2, 4-5, 7, 9-11, 13, 15, 17-22, 24 and 27

The same arguments above apply to independent claim 27, and thus all of the remaining dependent claims as well.

Conclusion

In light of the above remarks, Applicants respectfully request that the Examiner reconsider this application with a view towards allowance. The Examiner is invited to call the undersigned attorney at (650) 843-4000, if a telephone call could help resolve any remaining items.

Respectfully submitted,

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